Radiation Physics Note 65

Low Level Radioactive Waste Volume Reduction Experience At Fermilab

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Fermilab has always made an effort to minimize the amount of low level radioactive waste generated. As the costs for disposal have rapidly increased, more and more effort has been made to minimize the amount generated. Early in 1986, some pilot studies were conducted to study the economics of a "sorting and screening" program. By the latter part of 1986, it was apparent that a sorting and screening program was economical. Since January of 1987, all "radioactive waste" collected is handled as follows.

1. Liquids: Each container of oil or water is sampled and analyzed for radioactivity.

   a. Nonradioactive water is dumped. Nonradioactive oil is analyzed for hazardous constituents and disposed of according to EPA regulations as a special waste.

   b. Radioactive oil is absorbed into a flammable matrix and shipped to DOE, Richland. Radioactive water is solidified (concrete) and then utilized in the construction of shielding blocks as discussed below.

2. Solids: Each item is checked for radioactivity.

   a. Nonradioactive materials are sorted into items to be recycled (mostly metal) and "trash" and dealt with accordingly.

   b. Radioactive material is sorted into items which can be used for shielding (most metallic items), compactible, and noncompactible low level waste.

The items which can be used for shielding are packed into steel boxes. When full, the boxes are filled with concrete. The result is a useful shielding block, with somewhat higher density than ordinary concrete shielding blocks. These blocks will be used on site mostly in areas where the shielding material will be radioactivated by the accelerator beam.

The compactible radioactive material (mostly disposable clothing and other dry lab waste), noncompactible material not useful in constructing shielding blocks, and radioactive oil constitute the radioactive waste generated at Fermilab.

The results of this sorting and screening program for 1987 (January through June) has been as follows:

	#	CUBIC FEET
55 gallon drums collected (7.4 cubic feet each)	133	984
Steel boxes collected (56 cubic feet each)	8	448
30 gallon drums of oil (4 cubic feet each)	4	16
30 gallon drums of water (4 cubic feet each)	10	40
Bags of compactible material	15	64
Miscellaneous scrap		613
Total collected		2,165
LL Waste Volume		113 ft^3 (15 drums)

In summary, our experience during the first 6 months has been that careful sorting and screening of all material collected as "radioactive waste" produces a 20:1 volume reduction. That is, only one cubic foot in 20 collected needs to be handled as low level radioactive waste.